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### Remarks

Claims 1-8 are pending. Claims 1 and 4 are the only independent claims.  
Reconsideration and reexamination of the application is respectfully requested.

The claim 1 has been amended to define that the pre-expanded polypropylene beads are substantially positioned "*mutually adjacent to one another*", in a manner which is believed to overcome the rejection under 35, U.S.C 112, second paragraph.

The new claims 6-9 define particular technical aspects of the invention as disclosed originally, please see the original disclosure e.g. at: page 10, lines 21-22 (claim 6); page 11, line 2 (claim 7); page 11, line 4 (claim 8); and page 5, lines 7-9 (claim 9).

Applicant further respectfully submits that the invention defined by the amended claims is patentable over the prior art of record.

In particular, applicant's claimed composite polymeric material includes the pre-expanded beads of polypropylene and the polymerized resinous matrix inside of which the pre-expanded polypropylene beads are dispersed, whereby the polymerized resinous matrix fills the voids among the polypropylene beads that are pre-expanded prior to the polymerization of the resin matrix.

With such a claimed structure, the composite polymeric material advantageously has a light-weight structure combined with a particularly high and constant impact energy absorbing character, due to the fact that the pre-expanded polypropylene beads which have not been affected by the polymerization of the resinous matrix are efficiently capable of compressing and returning to their original shape under the impact energy for an effective kinetic energy dissipation and shock wave propagation damping even with subsequent impacts (see applicant's original disclosure e.g., page 5, lines 3-17 and page

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11, lines 3-8). Moreover, since the polypropylene beads are in a pre-expanded configuration which is non-effected by the polymerization of the polymerized resin matrix, efficiency in manufacture of the composite polymeric material is advantageously provided since the quantity of pre-expanded polypropylene beads needed for a specific shape, and the weight and density of the finished product, are easily known and predictable even before the product is manufactured (see applicant's original disclosure e.g., page 8, lines 14-18).

The prior art of record does not disclose, nor does it suggest to a person having ordinary skill in the art, applicant's claimed composite polymeric material for arriving at the combined advantageously and surprising effects as described above.

**Broersma (US 5699561)** discloses a helmet molding process in which, in a first embodiment, expandable polystyrene (E.P.S.) beads or expandable polypropylene (E.P.P) beads are filled into a helmet shell (column 2, lines 66-67), which as the Examiner may appreciate is far removed from applicant's claimed invention. In a second embodiment, **Broersma (US 5699561)** employs pre-expanded E.P.S. or E.P.P beads, however such pre-expanded beads are simply left alone to form the impact attenuating material (column 3, lines 55-59), which, as the Examiner may also appreciate, also does not anticipate nor render obvious applicant's claimed combination. Finally, **Broersma (US 5699561)** teaches to employ a two-part urethane foam system including constituents that chemically react and expand in the helmet cavity (see column 4, lines 9-19). Again, such expanding foam system is far removed from applicant's claimed composite polymeric material including pre-expanded polypropylene beads that are embedded in a polymerized resinous matrix. From the description in **Broersma (US 5699561)** of the expanding foam system, applicant submits that it is only fair to assume that such system does not include pre-expanded polypropylene beads. Moreover, even though **Broersma (US 5699561)** discloses use of pre-expanded E.P.P beads, the teaching therein is clearly one of employment of such beads on their own. A fair reading of **Broersma (US 5699561)**, made without any

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improper ex post facto analysis thereof based upon applicant's disclosure, leads to the conclusion in fact that **Broersma (US 5699561)**, does not disclose or fairly suggest, to a person having ordinary skill in the art as required by 35 U.S.C. 103, applicant's claimed combination of features as set forth in the amended claim 1 presented herewith.

Furthermore, **Broersma (US 5699561)** clearly does not offer any teaching, hint, or suggestion of the combined advantageous affects of applicant's claimed invention, as explained above, of a composite polymeric material having a light-weight structure combined with a particularly high and constant impact energy absorbing character, and which is further efficient in manufacture since it does not require difficult dosing of expanding constituents. Applicant submits in fact that such combined advantageous results are surprising and unexpected over the prior art of record.

Similar considerations also apply to all of the other prior art references of record which have been duly and carefully considered, including **Sibley et al (US 5298208)** and **Babinec et al (US 6380294 B1)** cited by the Examiner.

Finally, applicant submits that the amended claims are patentably distinguished over **U.S. Patent No. 6326077 B1**, however in order to allow the application to quickly pass to grant, a terminal disclaimer in compliance with 37 CFR 1.321 (c) is attached hereto.

In view of the foregoing, applicant respectfully solicits allowance of pending claims 1-9.

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Respectfully submitted,



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Encl.: -Abstract of the Disclosure.  
-Terminal Disclaimer.